

THE WING VENATION OF LOMATIINAE (DIPTERA-BOMBYLIIDAE).

By G. H. HARDY.

(One Text-figure.)

[Read 18th April, 1956.]

Synopsis.

The forty-five points along veins of the wings in subfamily Lomatiinae, points where occasional cross-veins and spur-veins are found, are recorded and are explained on the theory that they are remnants of a former reticulate venation. One new synonym is given for *Comptosia maculosa* Newman.

INTRODUCTION.

Needham (1908) suggested that a more or less irregular meshwork of cross-veins once existed in the wings of Diptera, and this idea was treated as a theory in Hardy (1951), where it is noted that such a reticulation still exists in the wings of some Nemestrinidae. New facts since discovered support the view that those flies which exhibit veins taking wavy and recurrent courses in their vein pattern, and also spur-veins which are frequently found, have retained in these characters a remnant of an original reticulation.

The Lomatiinae developed a venation somewhat variable and distinctly differing from the normal dipterous types. This subfamily may be retaining, therefore, veins in a pattern that may yield data towards showing the original type from which various Brachycerous vein patterns had developed.

The present study is made possible through the courtesy of Mr. H. F. Lower, who supplied twelve specimens of *Comptosia maculosa* Newman which show a wide range of "supernumerary" veinlets occurring on the species. From these specimens come abundant new facts added to the data previously gathered.

The Venation Seen in Published Figures.

In the paper of Edwards (1934) on genus *Comptosia* and its allies, thirty-two photographs of wings yielded fifteen points where cross-veins and spur-veins commonly occur in the subfamily. These veinlets are incorporated in the composite diagram, each point being numbered for references as follows.

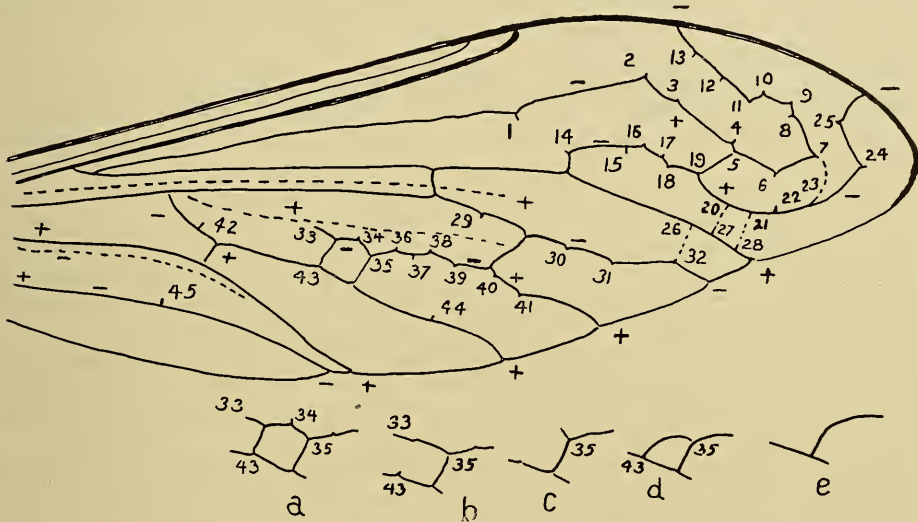
In Edwards' figure 1, *Comptosia brunnea* Edw., the venation is reduced to main-veins with simple curves, and no angulations mar the even flow of the pathway taken by any vein. This is a venation reduced to a basic type accepted in taxonomy for the genus. In figure 2, *C. maculosa* Newman, about which more data are given below, there is a vein crossing between points 5 and 19, which is a character found to be consistently present in the species. There are spur-veins just indicated at points 6, 7 and 14, and these spurs may become very pronounced on some specimens recorded below. In figure 3, *C. vittata* Edw., the same cross-vein occurs, and another one is crossing between points 21 and 28. Figure 4, *Oncodossia plana* Walker, has the veinlet crossing between 5 and 19, but figure 5, *O. patula* Walker, has only spurs at 35, 37 and indicated at 38. Figure 13, *Comptosia cognata* Walker, has two radial-median cross-veins, the second being between points 26 and 32; also a spur is at 35. Figure 20, *C. plana* Walker, shows veins crossing from 5 to 19 and from 6 to 22; a spur is indicated at 38. Interpreting positions in figure 21, *C. serpentiger* Walker, leaves some doubt. The vein crossing towards the apex of the radial field may not be homologous with that of figure 20, but concerned with points 7 and 23, and that apparent crossing vein just above the radial-median cross-vein is probably a mark, as no mention of it is made in the text. A spur is at 35. Figures 26 to 29 are wings of four South American species

of *Macrocondyla*, having a vein crossing from 5 to 19, and another from 20 to 27 in three of the figures. In addition, figure 27 has yet another from 21 to 28, whilst figure 26 has a vein between points 26 and 32. In figure 29 there is a cell that probably does not conform with that within the loop in the median cell of *Comptosia*, but rather is formed by a vein crossing between points 37 and 41, but this will need confirmation.

COMPTOSIA MACULOSA Newman.

Neuria maculosa Newman, 1841, *Entomologist*, 1: 221. *Comptosia fulvipes* Bigot, 1892, *Ann. Soc. ent. France*, (7) 61: 359.

Synonymy.—The presence or absence of the median abdominal stripe was all that could be found to distinguish the two forms for which Edwards proposed the *maculosa*-



Text-figure 1.

Supernumerary veins, veinlets and spur-veins found in the genus *Comptosia* and its allies, are shown in the composite figure and their positions in the venational pattern are indicated by numerals 1 to 45.

Veins that are longitudinal in direction and marked by broken lines are vestigial: The two upper ones are convex, and the lowest is concave. Crossing veinlets indicated by a line of dots between spurs, are sometimes present.

An extra cell in the median field, below points 33, 34 and 35, is bordered by a crossing veinlet between points 33 and 43. The reduction of this leaves various forms shown in figures a to e.

Figure a shows the cell complete with its spur-veins radiating from it. Figure b shows the elimination of the crossing veinlet which may leave a spur at 43. Figure c shows further reduction leaving a spur at 35. Figure d shows elimination of spurs and the path taken between points 35 and 43 becomes shortened to a bow-form. Even the disappearance of this, as shown in Figure e, leaves the remaining vein taking a simple curved path.

In the text it is assumed that these variations in the wing pattern of Lomatiinae are vestiges of an original reticulation, which reticulation has become lost to Bombyliidae.

The various longitudinal veins are marked convex (+) and concave (-), and it will be noted that they do not consistently show one form, but may change in their course, showing such veins are complex, thus accounting for the curving paths taken in the radial field. This especially applies to sections of veins between points 2 and 6, and between 16 and 22.

group under subgenus *Aleucosia*. The stripe concerned grades to elimination point on the series now studied, and other markings are similarly variable. Apparently Edwards' group represents one valid species and the name given by Bigot becomes a synonym of it.

Venation.—The veins on the wing of this species prove to be very variable, the main veins varying from wavy, even, rather angulated paths to gently curving lines.

The presence of cross- and spur-veins also varies. However, all specimens seen have the vein* crossing between points 5 and 19 shown on the accompanying diagram. This venation is basic for the species. The minimum venation in the present series has no extra cross-veins or spurs, and the specimen has been numbered 1. The specimen numbered 2 has, in addition, a spur-vein at point 14, and, on the left wing only, another at 35.

That numbered 3 has the same two spur-veins on both wings and another at 45 on the right one.

Number 4 is similar to Number 3, but misses the spur at 45 and has an additional one at 39 on the left wing.

Number 5 is similar to 4, with an extra spur-vein at points 39 and 41 on both wings.

Number 6 has the loop of the median cell on the right wing between points 35 and 43 without those associated spur veins, whereas the left wing has only a spur at 35. Another spur on both wings is at 14, and indications are strongly pronounced of another at 24 on the right wing.

Number 7 has the median loop interrupted on both wings, thus leaving spurs at points 35 and 43, and others are at 14 and 45. The right wing has spurs at 8, 38 and 42, yet another is faintly indicated by a curve occurring at 13. One on the left wing is at 39.

Number 8 has spurs at 10, 35 and 38, additional ones on the right at 6, 7 and 9, and on the left wing at 11 and 36. Some indications are at 24 on the right and at 1, 2 and 18 on the left wing.

Number 9 is interesting in having a very definite but short spur at point 24, which otherwise is indicated by an angulation there occasionally on other specimens. Other spurs are at 14 and 35, and in addition the left wing has one at 8.

Number 10 has the median loop complete with the spur-veins associated therewith, but limited to the right wing. Spurs are at 9, 10 and 36 on both wings, at 8, 33, 34 and 39 on the right, at 35 and 38 on the left, and indications are at 14, with additional ones at 3, 4, 12 and 16 on the right wing.

Number 11 has a spur at 10, 11, 14, 29, 35, 36 and 38. Extra ones are at 39 on the right, and at 30, 31, 33, 34 and 40 on the left. Indications are faint at 13 and 31 on the right and at 1, 2, 7, 9, 11 and 13 on the left.

Number 12 has the median loop between 35 and 43 without the spurs connected therewith on the left wing. Spur-veins are at 13, 31 and 36 on both wings, at 8, 10, 15, 16, 17, 30 and 38 on the right, and at 11, 37 and 44 on the left wing. Indications are at 1, 2 and 25 on both and faintly at 7, 10 and 13 on the left wing.

In addition to the above a strongly marked *vena-spuria* and a similar convex darkened remnant of a longitudinal vein passing through the median cell. These are marked by a broken line in the diagram and is a feature discussed in Hardy (1954).

Between points 2 and 6, and between 16 and 22 approximately, these radial branches are convex, thus indicating their complex nature in the part of the radial field that is normally concave in Diptera. The upper median branch is concave up to the wing border, the lower one is convex from point 40 to the apex. Markings on the wing correspond closely to those showing in Edwards' figure 2, only slight variations being noted in these.

Hab.—South Australia: six males and six females on *Melaleuca* flowers at Hartley, near Wellington, 16.10.1951 (H. F. Lower). This series is now deposited in the Australian Museum, Sydney. In distribution this species seems to be associated with the Mallee country of South and Western Australia.

Remarks.—In Edwards (1934) are shown fifteen points where veinlets are represented by spur- and cross-veins issue from the main-veins, and these are marked in the compounded diagram. Eight points so marked, namely 20, 21, 22, 23, 26, 27, 28 and 32, are not represented on the present series of twelve specimens. These latter include thirty-seven further points, of which twenty-one occur on a single specimen (No. 12

* On another species (*C. hermeteles* Schin.), where this cross-vein also occurs, occasionally it is interrupted and even quite absent.

above), which is 46.7% of all forty-five known to occur in the Lomatiinae and 56.75% found in the series of specimens examined.

Theoretically *Comptosia* may be regarded as retaining in Asiloidea some characters of an original reticulation now largely lost. This is parallel to other cases, such as Tipulidae in Nematocera and Nemestrinidae in Tabanoidea, where so-called "super-numerary" veins are plentifully recorded in literature. Similar extra veinlets occur in Muscoidea, chiefly in the subcostal area and the median cell, whilst Syrphoidea have them widely distributed over the wing.

References.

- EDWARDS, F. W., 1934.—On the genus *Comptosia* and its allies. *Encyc. Ent. Dipt.*, 7: 81-112.
- HARDY, G. H., 1951.—The reticulation theory of wing venation in Diptera. *J. Soc. Brit. Entom.*, 4: 27-36.
- , 1954.—Reduction in the median field in the wing venation of Diptera. *Ent. mon. Mag.*, 90: 2-3.
- NEEDHAM, J. G., 1908.—Report of the Entomological Field Station conducted at Old Forge, N.Y., in the summer of 1905. *New York State Bulletin*, 124: 156-263 (wing venation on pp. 217-238).